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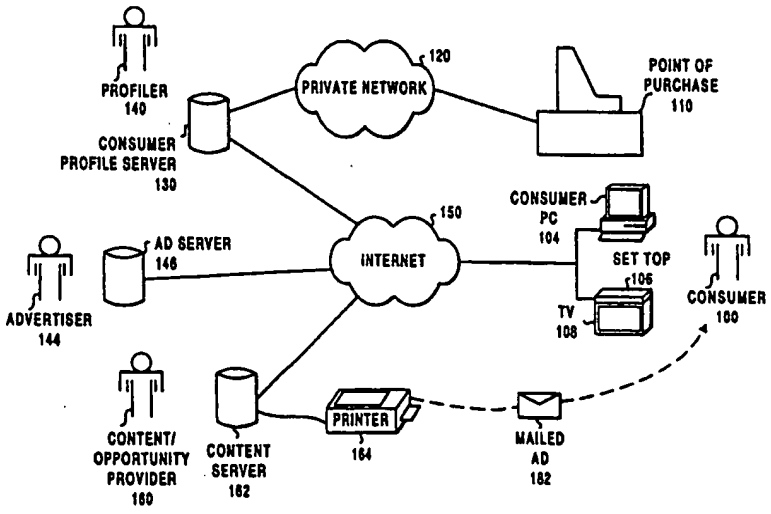
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(54) Title: ADVERTISEMENT AUCTION SYSTEM



(57) Abstract

An advertisement auction system is presented in which content/opportunity providers (160) announce to advertisers (144) that they have an opportunity to present an advertisement to a consumer (100). The advertiser (144) transmits ad characterization information which is correlated with the consumer profile. Based on the results of the correlation, the advertisers (144) place bids for the advertisement opportunity. Upon acceptance of a bid the advertisement is delivered to the consumer (100). The system can be applied to a variety of media including Internet advertisements, advertisements delivered over cable television systems, and printed materials such as magazines and periodicals. The system allows consumers (100) to receive more targeted advertisements which match their lifestyle and interests, insures advertisers (144) that their ads will be received by the appropriate audience, and allows the content/opportunity provider (160) the ability to maximize revenue for the advertising opportunity.

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TITLE

Advertisement auction system

Background of the Invention

The advent of the Internet has resulted in the ability to communicate data across the globe instantaneously and will allow for numerous new applications which enhance consumer's lives. One of the enhancements which can occur is the ability for the consumer to receive advertising which is relevant to their lifestyle. Such "targeted ads" can potentially reduce the amount of unwanted information which consumers receive in the mail, during television programs, and when using the Internet.

From an advertiser's perspective the ability to target ads can be beneficial since they have some confidence that their ad will at least be determined relevant by the consumer, and therefore will not be found annoying because it is not applicable to their lifestyle. The advertiser also desires to maximize the effect of an advertisement and to have an acceptable return on investment from advertising, principally in the form of increased sales. Different systems for matching a consumer profile to an advertisement have been proposed such as the U.S. Patent No. 5,774,170, which discloses a system for delivering targeted advertisement to consumers. In this system, a set of advertisements is tagged with commercial identifier (CID) and, from the existing marketing database, a list of prospective viewers is also identified with CID. The commercials are displayed to the consumers when the CIDs match.

Other systems propose methods for delivering programming tailored to subscribers' profile. U.S. Patent No. 5,410,344 discloses a method for selecting audiovideo programs based on viewers' preferences, wherein each of the

audiovideo programs has a plurality of programs attributes and a corresponding content code representing the program attributes. The method comprises the steps of storing a viewer preference file, which includes attributes ratings, which represents the degree of impact of the programs attributes on the viewer and, in response to the comparison of viewer preference file with the program content codes, a program is selected for presentation to the viewer.

The Internet has spawned the concept of "negatively priced information" in which consumers can be paid to receive advertising. Paying consumers to watch advertisements can be accomplished interactively over the Internet, with the consumer acknowledging that they will watch an advertisement for a particular price. Previously proposed schemes such as that described in U.S. Patent 5,794,210, entitled "Attention Brokerage," of which A. Nathaniel Goldhaber and Gary Fitts are the inventors, describe such a system, in which the consumer is presented with a list of advertisements and their corresponding payments. The consumer chooses from the list and is compensated for viewing the advertisement. The system uses also software agents representing consumers to match the consumer interest profiles with advertisements. The matching is done using "relevance indexing" which is based on hierarchical tree structures. The system requires real-time interactivity in that the viewer must select the advertisement from the list of choices presented.

The ability to place ads to consumers and compensate them for viewing the advertisements opens many possibilities for new models of advertising. However, it is important to understand the demographics and product preferences of the consumer in order to be able to determine if an advertisement is appropriate.

Although it is possible to collect statistical information regarding consumers of particular products and compare those profiles against individual demographic data points of consumers, such a methodology only allows for selection of potential consumers based on the demographics of existing customers of the same or similar products.

U.S. Patent 5,515,098, entitled "System and method for selectively distributing commercial messages over a communications network," of which John B. Carles is the inventor, describes a method in which target household data of actual customers of a product are compared against subscriber household data to determine the applicability of a commercial to a household. Target households for a product or service are characterized by comparing or correlating the profile of the customer household to the profile of all households. A rating is established for each household for each category of goods/services. The households within a predefined percentile of subscribers, as defined by the rating, are targeted by the advertiser of the product or service.

Another previously proposed system, described in U.S. Patent 5,724,521, entitled "Method and apparatus for providing electronic advertisements to end users in a consumer best-fit pricing manner," of which R. Dedrick is the inventor, utilizes a consumer scale as the mechanism to determine to which group an advertisement is intended. A consumer scale matching process compares the set of characteristics stored in a user profile database to a consumer scale associated with the electronic advertisement. The fee charged to the advertiser is determined by where the set of characteristics fall on the consumer scale. Such a system requires specification of numerous parameters and weighting factors, and requires access to specific and non-statistical personal profile information.

In the various forms of media including television, printed materials such as magazines and periodicals, and the Internet, opportunities for the transmission of advertisements to consumers frequently arise. The groups who have the opportunities to present advertisements to consumers receive payment from the advertisers, and need to maximize their revenues. In addition, by placing ads which will be found useful by the consumer, the value of the transmitted programming to the consumer may be increased.

For the foregoing reasons, there is a need for an advertisement auction system which can match advertisements with consumers and allow the entity who can present the advertisement to the consumer to maximize their income.

Summary of the Invention

The present invention provides a means for the auctioning of advertisement opportunities based on the correlation of an advertisement with a consumer profile. The invention can be realized over a network of computers such as the Internet and can be used for the auctioning of advertisements which are delivered as part of broadcast video programming, printed material such as magazines and periodicals, or as part of web site pages.

In a preferred embodiment the invention is realized over a networked computer environment, with notification of an advertising opportunity being presented to at least one advertiser. The advertiser transmits an advertisement characterization which is used to determine the appropriateness of the advertisement to one or more consumers. The results of this determination, in the form of a correlation factor, is transmitted to the advertiser who can subsequently place a bid for the advertisement opportunity. Upon acceptance of the bid the advertisement

is delivered to the content/opportunity provider who delivers the ad to the consumer.

In a preferred embodiment the advertisement characterization is in the form of an ad characterization vector, and the consumer characterization is in the form of a consumer characterization vector, with the correlation factor being calculated as the scalar product between the ad characterization vector and the consumer characterization vector.

The ad characterization vector can contain both a demographic characterization of the advertisement as well as a product preference characterization of the advertisement. The consumer characterization vector can contain both demographic and product preference characterizations.

In a preferred embodiment the auction process includes soliciting bids from a plurality of advertisers, and repeating the bidding process to maximize the revenue for the advertising opportunity.

An advantage of the present invention is that advertisers can target their ads at consumers with the appropriate demographic characteristics, and can target consumers who buy a competitor's product. The content/opportunity provider can charge for the advertisement according to how well matched the advertisement is to the consumer and the advertiser's goals. The matching can be in the form of demographic matching, product preference matching, or a combination of both.

The present invention provides for the ability for consumers to receive more targeted advertisements which match their lifestyle and interests, the ability to insure advertisers that their ads will be received by the appropriate audience, and the ability to allow the content/opportunity provider the ability to maximize revenue for the advertising opportunity.

Brief Description of the Drawings

The accompanying drawings, which are incorporated in and form a part of the specification, illustrate the embodiments of the present invention and, together with the description serve to explain the principles of the invention.

In the drawings:

FIGS. 1A and 1B show user relationship diagrams for the present invention;

FIGS. 2A, 2B, 2C and 2D illustrate a probabilistic consumer demographic characterization vector, a deterministic consumer demographic characterization vector, a consumer product preference characterization vector, and a storage structure for consumer characterization vectors respectively;

FIGS. 3A and 3B illustrate an advertisement demographic characterization vector and an advertisement product preference characterization vector respectively;

FIG. 4 illustrates a computer system on which the present invention can be realized;

FIG. 5 represents an ad characterization vector with demographic characteristic basis vectors;

FIG. 6 represents pricing as a function of correlation; and

FIG. 7 represents a signal flow diagram for the advertisement auction process.

Detailed Description of the Preferred Embodiment

In describing a preferred embodiment of the invention illustrated in the drawings, specific terminology will be used for the sake of clarity. However, the invention is not intended to be limited to the specific terms so selected,

and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

With reference to the drawings, in general, and FIGS. 1 through 7 in particular, the method and apparatus of the present invention is disclosed.

FIG. 1A shows a user relationship diagram which illustrates the relationships between a advertisement auction system and various entities. As can be seen in FIG. 1, a consumer 100 can receive information and advertisements from a consumer personal computer (PC) 104, displayed on a television 108 which is connected to a settop 106, or can receive a mailed ad 182.

Advertisements and information displayed on consumer PC 104 or television 108 can be received over an Internet 150, or can be received over the combination of the Internet 150 with another telecommunications access system. The telecommunications access system can include but is not limited to cable TV delivery systems, switched digital video access systems operating over telephone wires, microwave telecommunications systems, or any other medium which provides connectivity between the consumer 100 and a content server 162 and ad server 146.

A content/opportunity provider 160 maintains the content server 162 which can transmit content including broadcast programming across a network such as the Internet 150. Other methods of data transport can be used including private data networks and can connect the content sever 160 through an access system to a device owned by consumer 100.

Content/opportunity provider 160 is termed such since if consumer 100 is receiving a transmission from content server 162, the content/opportunity provider can insert an advertisement. For video programming, content/opportunity provider is typically the cable network operator or the

source of entertainment material, and the opportunity is the ability to transmit an advertisement during a commercial break.

The majority of content that is being transmitted today is done so in broadcast form, such as broadcast television programming (broadcast over the air and via cable TV networks), broadcast radio, and newspapers. Although the interconnectivity provided by the Internet will allow consumer specific programming to be transmitted, there will still be a large amount of broadcast material which can be sponsored in part by advertising. The ability to insert an advertisement in a broadcast stream (video, audio, or mailed) is an opportunity for advertiser 144. Content can also be broadcast over the Internet and combined with existing video services, in which case opportunities for the insertion of advertisements will be present.

Although FIG. 1A represents content/opportunity provider 160 and content server 162 as being independently connected to Internet 150, with the consumer's devices being also being directly connected to the Internet 150, the content/opportunity provider 160 can also control access to the subscriber. This can occur when the content/opportunity provider is also the cable operator or telephone company. In such instances, the cable operator or telephone company can be providing content to consumer 100 over the cable operator/telephone company access network. As an example, if the cable operator has control over the content being transmitted to the consumer 100, and has programmed times for the insertion of advertisements, the cable operator is considered to be a content/opportunity provider 160 since the cable operator can provide advertisers the opportunity to access consumer 100 by inserting an advertisement at the commercial break.

In a preferred embodiment of the present invention, a pricing policy can be defined. The content/opportunity provider 160 can charge advertiser 144 for access to consumer 100 during an opportunity. In a preferred embodiment the price charged for access to consumer 100 by content/opportunity provider varies as a function of the applicability of the advertisement to consumer 100. In an alternate embodiment consumer 100 retains control of access to the profile and charges for viewing an advertisement.

The content provider can also be a mailing company or printer which is preparing printed information for consumer 100. As an example, content server 162 can be connected to a printer 164 which creates a mailed ad 182 for consumer 100. Alternatively, printer 164 can produce advertisements for insertion into newspapers which are delivered to consumer 100. Other printed material can be generated by printer 162 and delivered to consumer 100 in a variety of ways.

Advertiser 144 maintains an ad server 146 which contains a variety of advertisements in the form of still video which can be printed, video advertisements, audio advertisements, or combinations thereof.

Profiler 140 maintains a consumer profile server 130 which contains the characterization of consumer 100. The consumer profiling system is operated by profiler 140, who can use consumer profile server 130 or another computing device connected to consumer profile server 130 to profile consumer 100.

Data to perform the consumer profiling is received from a point of purchase 110. Point of purchase 110 can be a grocery store, department store, other retail outlet, or can be a web site or other location where a purchase request is received and processed. In a preferred embodiment, data from the point of purchase is transferred over a public or private network 120, such as a local area network within a

store or a wide area network which connects a number of department or grocery stores. In an alternate embodiment the data from point of purchase 110 is transmitted over the Internet 150 to profiler 140.

Profiler 140 may be a retailer who collects data from its stores, but can also be a third party who contracts with consumer 100 and the retailer to receive point of purchase data and profile consumer 100. Consumer 100 may agree to such an arrangement based on the increased convenience offered by targeted ads, or through a compensation arrangement in which they are paid on a periodic basis for revealing their specific purchase records.

Consumer profile server 130 can contain a consumer profile which is determined from observation of the consumer's viewing habits on television 108 or consumer PC 104. Such a characterization is frequently referred to as a subscriber characterization, since it is a profile which is obtained by monitoring the viewing habits of a subscriber. In a preferred embodiment, the channels or web sites viewed by a subscriber are monitored, and heuristic rules are applied to the sites to better determine the demographic and product preference characteristics of the subscriber. Based on the viewing characteristics of the subscriber, and in particular on the viewing time duration, or time spent on each channel or site, a subscriber profile is formed and updated. As an example, when viewing a product commercial, a characterization of the product is formed and based on the subscriber's viewing time for the commercial, the importance of that commercial in the overall demographic and product profile is obtained.

FIG. 1B illustrates an alternate embodiment of the present invention in which the consumer 100 is also profiler 140. Consumer 100 maintains consumer profile server 130 which is connected to a network, either directly or through

consumer PC 104 or settop 106. Consumer profile server 130 can contain the consumer profiling system, or the profiling can be performed in conjunction with consumer PC 104 or settop 106. A subscriber characterization system which monitors the viewing habits of consumer 100 can be used in conjunction with the consumer profiling system to create a more accurate consumer profile.

When the consumer 100 is also the profiler 140, as shown in FIG. 1B, access to the consumer demographic and product preference characterization is controlled exclusively by consumer 100, who will grant access to the profile in return for receiving an increased accuracy of ads, for cash compensation, or in return for discounts or coupons on goods and services.

FIG. 2A illustrates an example of a probabilistic demographic characterization vector. The demographic characterization vector is a representation of the probability that a consumer falls within a certain demographic category such as an age group, gender, household size, or income range.

In a preferred embodiment the demographic characterization vector includes interest categories. The interest categories may be organized according to broad areas such as music, travel, and restaurants. Examples of music interest categories include country music, rock, classical, and folk. Examples of travel categories include "travels to another state more than twice a year," and "travels by plane more than twice a year."

FIG. 2B illustrates a deterministic demographic characterization vector. The deterministic demographic characterization vector is a representation of the consumer profile as determined from deterministic rather than probabilistic data. As an example, if consumer 100 agrees to answer specific questions regarding age, gender,

household size, income, and interests the data contained in the consumer characterization vector will be deterministic.

As with probabilistic demographic characterization vectors, the deterministic demographic characterization vector can include interest categories. In a preferred embodiment, consumer 100 answers specific questions in a survey generated by profiler 140 and administered over the phone, in written form, or via the Internet 150 and consumer PC 104. The survey questions correspond either directly to the elements in the probabilistic demographic characterization vector, or can be processed to obtain the deterministic results for storage in the demographic characterization vector.

FIG. 2C illustrates a product preference vector. The product preference represents the average of the consumer preferences over past purchases. As an example, a consumer who buys the breakfast cereal manufactured by Post under the trademark ALPHABITS about twice as often as purchasing the breakfast cereal manufactured by Kellogg under the trademark CORN FLAKES, but who never purchases breakfast cereal manufactured by General Mills under the trademark WHEATIES, would have a product preference characterization such as that illustrated in FIG. 2C. As shown in FIG. 2C, the preferred size of the consumer purchase of a particular product type can also be represented in the product preference vector.

FIG. 2D represents a data structure for storing the consumer profile, which can be comprised of a consumer ID field 237, a deterministic demographic data field 239, a probabilistic demographic data field 241, and one or more product preference data fields 243. As shown in FIG. 2D, the product preference data field 243 can be comprised of multiple fields arranged by product categories 253.

The consumer ID 512 can be any identification value uniquely associated with consumer 100. In a preferred embodiment consumer ID 512 is a telephone number, while in an alternate embodiment consumer ID 512 is a credit card number. Other unique identifiers include consumer name with middle initial or a unique alphanumeric sequence, the consumer address, social security number.

The vectors described and represented in FIGS. 2A-C form consumer characterization vectors that can be of varying length and dimension, and portions of the characterization vector can be used individually. Vectors can also be concatenated or summed to produce longer vectors which provide a more detailed profile of consumer 100. A matrix representation of the vectors can be used, in which specific elements, such a product categories 253, are indexed. Hierarchical structures can be employed to organize the vectors and to allow hierarchical search algorithms to be used to locate specific portions of vectors.

FIGS. 3A and 3B represent an ad demographics vector and an ad product preference vector respectively. The ad demographics vector, similar in structure to the demographic characterization vector, is used to target the ad by setting the demographic parameters in the ad demographics vector to correspond to the targeted demographic group. As an example, if an advertisement is developed for a market which is the 18-24 and 24-32 age brackets, no gender bias, with a typical household size of 2-5, and income typically in the range of $20,000-$50,000, the ad demographics vector would resemble the one shown in FIG. 3A. The ad demographics vector represents a statistical estimate of who the ad is intended for, based on the advertisers belief that the ad will be beneficial to the manufacturer when viewed by individuals in those groups. The benefit will typically be

in the form of increased sales of a product or increased brand recognition. As an example, an "image ad" which simply shows an artistic composition but which does not directly sell a product may be very effective for young people, but may be annoying to older individuals. The ad demographics vector can be used to establish the criteria which will direct the ad to the demographic group of 18-24 year olds.

FIG. 3B illustrates an ad product preference vector. The ad product preference vector is used to select consumers which have a particular product preference. In the example illustrated in FIG. 3B, the ad product preference vector is set so that the ad can be directed at purchasers of ALPHABITS and WHEATIES, but not at purchasers of CORN FLAKES. This particular setting would be useful when the advertiser represents Kellogg and is charged with increasing sales of CORN FLAKES. By targeting present purchasers of ALPHABITS and WHEATIES, the advertiser can attempt to sway those purchasers over to the Kellogg brand and in particular convince them to purchase CORN FLAKES. Given that there will be a payment required to present the advertisement, in the form of a payment to the content/opportunity provider 160 or to the consumer 100, the advertiser 144 desires to target the ad and thereby increase its cost effectiveness.

In the event that advertiser 144 wants to reach only the purchasers of Kellogg's CORN FLAKES, that category would be set at a high value, and in the example shown would be set to 1. As shown in FIG. 3B, product size can also be specified. If there is no preference to size category the values can all be set to be equal. In a preferred embodiment the values of each characteristic including brand and size are individually normalized.

Because advertisements can be targeted based on a set of demographic and product preference considerations which

may not be representative of any particular group of present consumers of the product, the ad characterization vector can be set to identify a number of demographic groups which would normally be considered to be uncorrelated. Because the ad characterization vector can have target profiles which are not representative of actual consumers of the product, the ad characterization vector can be considered to have discretionary elements. When used herein the term discretionary refers to a selection of target market characteristics which need not be representative of an actual existing market or single purchasing segment.

In a preferred embodiment the consumer characterization vectors shown in FIGS. 2A-C and the ad characterization vectors represented in FIGS. 3A and 3B have a standardized format, in which each demographic characteristic and product preference is identified by an indexed position. In a preferred embodiment the vectors are singly indexed and thus represent coordinates in n-dimensional space, with each dimension representing a demographic or product preference characteristic. In this embodiment a single value represents one probabilistic or deterministic value (e.g. the probability that the consumer is in the 18-24 year old age group, or the weighting of an advertisement to the age group).

FIG. 5 illustrates an alternate embodiment in which a group of demographic or product characteristics form individual vectors which serve as basis vectors. As shown in FIG. 5, age categories form an age basis vector 1021, income categories form an income basis vector 1001, and family size categories forms a family size basis vector 1031. The consumer or ad characterization vector 1500 represents a set of characteristics of the advertisement, and by projecting the ad characterization vector onto age basis vector 1021, income basis vector 1001, family size

basis vector 1031, and other similarly defined basis vectors, it is possible to correlate the advertisement against groups of consumer or family characteristics. The extent to which the basis vectors are orthogonal will determine the uniqueness of the correlation result.

In a preferred embodiment, a correlation factor is calculated by taking the scalar product of the consumer characterization vector and the ad characterization vector. In taking the scalar product, each component of the ad characterization vector is multiplied with the corresponding element of the consumer characterization vector, with the sum being formed from all of the multiplications. In a preferred embodiment, each grouping within the vectors is normalized such that the probabilistic measures of age group values all sum to one, the income range values sum to one, and product preference values within a certain category sum to one. The resulting correlation factor can exceed one, with the maximum value being determined by the number of categories which have been normalized. In an alternate embodiment, normalization can be applied to the entire advertisement characterization and consumer characterization vectors, resulting in a normalized correlation result.

In an alternate embodiment correlation is performed by correlating individual aspects of the consumer profile against aspects of the advertisement characterization. The income range for the intended recipient of the advertisement can be correlated against the income range of a subscriber. By correlating one or more aspects of the consumer profile against the advertisement characterization a correlation factor can be determined. Other methods of correlation can be used and are known to those skilled in the art.

The correlation can be performed by profiler 140, content/opportunity provider 160, or may be performed in part by each of these entities.

Consumer profile server 130 can contain a consumer profile which is determined from observation of the consumer's viewing habits on television 108 or consumer PC 104. Determination of demographic and product preference information based on the consumer's use of services such as cable television and Internet access can be performed by monitoring the channel selections that a subscriber makes, and determining household demographics based on the subscriber selections and information associated with the programming being watched.

In one embodiment the channel selections are recorded, and based on the time of day during which the programming is watched and duration of viewing, heuristic rules are applied to make probabilistic determinations regarding the household demographics including age, gender, household size and income, as illustrated in FIG. 2A. This can be accomplished by applying heuristic rules which associate the programming with known and assumed characteristics for viewers of the programming. As an example, it is known that the probability that the viewer of a cartoon in the morning is in the 3-8 year old age group is high, thus if the household viewing habits consistently record viewing of cartoons the probability that the household will contain one or more viewers in the 3-8 year old age group is high.

In one embodiment information regarding the program is extracted from the Electronic Program Guide (EPG) which contains information regarding the scheduled programming. In another embodiment information regarding the programming is retrieved from the closed caption channel transmitted in the broadcast signal.

The volume at which the program is watched can also be stored and forms an additional basis for subscriber characterization, wherein the muting of a channel indicates limited interest in a particular program or advertisement.

In the case of an advertisement, muting of the advertisement can be used as a measure of the effectiveness (or ineffectiveness) of the advertisement and can serve as part of the basis for the subscriber characterization. The muting of a program, as well as the duration for which the program is watched, can also be used in the determination of the subscriber characterization vector.

By processing the recorded viewing habits in conjunction with programming related information and heuristic rules similar to those illustrated in FIG. 7 but related to programming rather than purchases, it is possible to construct a subscriber characterization vector which contains a probabilistic demographic profile of the household.

When used herein, the term consumer characterization vector also represents the subscriber characterization vector previously described. Both the consumer characterization vector and the subscriber characterization vector contain demographic and product preference information which is related to consumer 100.

The subscriber characterization system can update the subscriber profile based on a weighted average in which the weighting factor is determined as the ratio of the viewing time divided by a session time. In a preferred embodiment the viewing time is determined by monitoring the amount of time a viewer watches a particular program. The volume at which the program is watched is also monitored and can be used in creating the weighting factor. The session time can be determined as the amount of time the viewing device has been on continuously. Other definitions of viewing time and session time, as well as other methods of creating and updating the subscriber profile can be used.

The subscriber characterization system can also be used to determine product preferences by monitoring the extent to

which an advertisement is viewed. If the advertisement is viewed in full the system makes the determination that the product or brand represented in the advertisement is of interest to the subscriber, and that other similar products or brands will also be of interest.

The subscriber characterization system produces a subscriber profile which can be considered to be the functional equivalent of the consumer profile. When used herein, the terms consumer characterization and consumer characterization vector encompass subscriber characterization and subscriber characterization vector respectively.

FIG. 4 shows the block diagram of a computer system for a realization of the advertisement auction system. A system bus 422 transports data amongst the CPU 203, the RAM 204, Read Only Memory - Basic Input Output System (ROM-BIOS) 406 and other components. The CPU 203 accesses a hard drive 400 through a disk controller 402. The standard input/output devices are connected to the system bus 422 through the I/O controller 201. A keyboard is attached to the I/O controller 201 through a keyboard port 416 and the monitor is connected through a monitor port 418. The serial port device uses a serial port 420 to communicate with the I/O controller 201. Industry Standard Architecture (ISA) expansion slots 408 and Peripheral Component Interconnect (PCI) expansion slots 410 allow additional cards to be placed into the computer. In a preferred embodiment, a network card is available to interface a local area, wide area, or other network. The computer system shown in FIG. 4 can be part of consumer profile server 130, or can be a processor present in another element of the network.

The present invention can be realized in a variety of programming languages including but not limited to C, C++, Smalltalk, Java, Perl, and can be developed as part of a

relational database. Other languages and data structures can be utilized to realize the present invention and are known to those skilled in the art.

Although FIG. 4 represents an individual computer which can be used to realize consumer profile server 130, ad server 146, or content server 162, these entities can be realized as distributed platforms in which multiple processors work together over a local area network, wide area network, or the Internet. The invention can be realized on any number of computers which work together to conduct the advertisement auction.

FIG. 6 illustrates two pricing schemes, one for content/opportunity provider based pricing 970, which shows increasing cost as a function of correlation. In this pricing scheme, the higher the correlation, the more the content/opportunity provider 160 charges to air the advertisement.

Content/opportunity provider based pricing 970 presents a pricing scheme in which the charge for presenting an advertisement to a consumer increases as a function of the degree of correlation of the advertisement with the consumer. For advertisements which are more correlated with the consumer and are thus more likely to be successful in terms of the sale of an item related to the advertisement, the price is higher than for advertisements which show a relatively low degree of correlation with the consumer.

FIG. 6 also illustrates consumer based pricing 960, which allows a consumer to charge less to receive advertisements which are more highly correlated with their demographics and interests. Consumer based pricing 960 can be used to allow consumers to preferentially receive advertisements which are highly correlated with their demographic and product preference profiles. As illustrated by consumer based pricing 960 in FIG. 6, the consumer may

charge to view and advertisement, but can charge less for advertisements which are highly correlated with their profile, and thus are likely to be of more interest.

FIG. 7 illustrates a signal flow diagram indicating the representative signals which are transmitted between advertiser 144, content/opportunity provider 160, and profiler 140. The signal flow diagram represents signals transmitted between the entities marked over time, with time progressing from the top towards the bottom of the diagram. References to advertiser 144, content/opportunity provider 160, and profiler 140, also include the computer systems which represent these individuals or organizations, and can be stand-alone servers, or groups of servers which are networked over a local area or long distance network to produce a virtual organization. As an example, an advertiser can maintain a number of servers and web sites which together contain all of the advertisements related to their accounts. Similarly, the content/opportunity provider system can consist of a network of computers owned by a cable television operator and which are capable of keeping track of all of the advertisement insertion opportunities.

Referring to FIG. 7 content/opportunity provider 160 transmits an announce opportunity message 700 to one or more advertisers 144. The announce opportunity message 700 can be in a number of forms including e-mail messages, announcements on a web site, access to upcoming opportunities downloaded from a File Transfer Protocol (FTP) site, or other electronic means.

In a preferred embodiment, the announce opportunity message 700 consists of a listing of advertising opportunities as posted on a web site. Advertiser 144 uses a manual or automated system to load the web page containing the announce opportunity message 700. Transmission of the announce opportunity message 700 occurs when advertiser 144

loads the web page with the listing of advertising opportunities. The searching for and requesting of web pages by advertiser 144 can be done in an automated fashion using scripts or software agents maintained by the advertiser's computer system.

Advertiser 144 then transmits an ad characterization 710. The ad characterization can be received by content/opportunity provider 160 or directly by profiler 140. In a preferred embodiment content/opportunity provider 160 also adds a consumer ID for one or more consumers for which the opportunity is present, and transmits a combined ad characterization consumer ID(s) message 712 to profiler 140.

In a preferred embodiment the ad characterization 710 is in the form of an ad characterization vector containing both demographic and product preference information. In an alternate embodiment the ad characterization contains fields representing the target audience in a non-vector format. Vectorization can be performed by opportunity/content provider 160, by profiler 140, or by another party.

Profiler 140 retrieves consumer characteristics which can be in the form of probabilistic information regarding the consumer, deterministic data regarding the consumer, or product preference information.

Profiler 140 performs a correlation operation, the results of which are transmitted as a correlation factor or other correlation result to content/opportunity provider 160. In a preferred embodiment a pricing/fee arrangement message which represents the price for providing the advertisement as well as a fee for performing the correlation or accessing the consumer profile is transmitted along the correlation result.

As illustrated in FIG. 7, the combined correlation and pricing/fee message 720 is received by content/opportunity

provider 160, who transmits the correlation result to advertiser 144. In a preferred embodiment the correlation result is transmitted along with a minimum bid in a correlation and minimum bid message 722. The minimum bid represents the least amount which will be accepted to transmit the advertisement in the announced opportunity.

Advertiser 144 transmits a bid contained within a bid message 730. The bid represents the amount that an advertiser is willing to pay for a transmission opportunity. In a preferred embodiment the bid is calculated by advertiser 144 based on the results of the correlation.

In a preferred embodiment content/opportunity provider 160 can solicit additional bids from advertiser 144, indicating the highest present bid in a message transmitted to all of the advertisers. In this embodiment the highest present bid is transmitted in a highest present bid message which is transmitted from content/opportunity provider 160 to a plurality of advertisers 144 after the reception of one or more bid messages 730.

Once the content/opportunity provider 160 has determined an acceptable bid, an acceptance message 740 is sent to advertiser 144. The acceptance message 740 completes the contractual arrangement with advertiser 144, and provides notification that the advertisement can be delivered to the consumer.

As shown in FIG. 7, an advertisement is transmitted in an advertisement message 750. Advertisement message 750 includes the advertisement itself along with any other pertinent information including the advertisement duration and other information useful for ad insertion.

Once delivered to content/opportunity provider 160 the advertisement can be delivered to consumer 100. Advertiser 144 is subsequently billed for the advertising opportunity.

With respect to the messages illustrated in FIG. 7 and described herein, the messages can be transmitted in the form of e-mail messages, automated e-mail messages, or can be generated in Java based programming scripts which send messages encapsulated in Internet protocol packets. Other programming languages, operating system script languages, and transport protocols can be used to realize the operations described in FIG. 7 and are known to those skilled in the art.

As an example of the industrial applicability of the invention, the advertisement auction system can be utilized by a cable television operator to solicit and accept bids for advertisements placed in commercial times during broadcast programming. In this application the cable television operator acts as content/opportunity provider 160. The profiler 140 may also be the cable operator, the consumer 100, or a third party paid for access to the consumer profile.

In the cable television application, the cable television operator announces an advertising opportunity which corresponds to a commercial spot of a particular duration, occurring during a particular program. As an example, the cable television operator may announce, via electronic means, the availability of a 30 second spot during a prime time sitcom. Such an announcement can be transmitted well in advance of the commercial spot, or can be broadcast a few minutes before the commercial spot is available.

Upon receiving notification of the opportunity, advertisers transmit an ad characterization. The cable operator performs a correlation operation between the ad characterization and the consumer profile. In the event that the cable operator is the profiler the cable operator directly performs a correlation to determine a correlation

factor between the advertisement and the consumer/subscriber. Alternatively, the cable operator commissions a correlation to the consumer or a third party, and in receiving a correlation factor, accomplishes the step of correlation. The subscribers in the cable system may not be presently watching the program, and the correlation result can indicate the potential match of the advertisement to the consumer/subscriber, predicated on their viewing of the program.

Having received a correlation result the cable operator transmits the correlation to the advertiser, and may also send a minimum bid which indicates the lowest acceptable bid for that commercial spot. The advertiser transmits a bid, and when notified of acceptance of the bid, transmits the advertisement for insertion into the commercial spot. The advertisement can be transmitted in a variety of digital formats including MPEG or other proprietary video format, and inserted into the broadcast stream for transmission to the subscriber.

In broadcast cable television systems, individual channels will be established for transmission of the subscriber specific advertisement, with instructions being issued to the subscriber equipment to tune to that channel for reception of the targeted advertisement. Alternate mechanisms for delivery of specific video programming in cable television environments are well known to those skilled in the art. In switched digital video systems each subscriber receives individualized programming and the targeted advertisement can be inserted directly in the subscriber's video stream.

In the previously discussed application for cable television the cable television operator will prefer to solicit bids from multiple advertisers, and can repeat the

bid process in order to obtain the highest bid possible for the commercial spot.

Another application of the present invention is for the delivery of targeted printed material, such as the insertions into periodicals including magazines and newspapers. In this application, the publisher, printer and delivery organization serve as content/opportunity provider 160. Knowing that they will deliver a newspaper or other periodical to consumer 100, they announce an advertisement opportunity to the advertising community. Advertisers respond with ad characterization information, and upon receiving correlation results, place bids to have their printed material inserted into the periodical. The content/opportunity provider selects a bid and upon receiving the advertisement, prints the ad, inserts it into the periodical, and delivers it to the subscriber.

Yet another application of the present invention is the delivery of targeted advertisements over the Internet. In this application a consumer can be accessing web sites and may be presented with a web site which contains advertising opportunities. The server hosting the page acts as content/opportunity provider 100. Upon accessing the web site the server hosting the page announces an advertising opportunity to advertisers. Advertisers transmit ad characterization information which is correlated against the consumer by a profiler. The profiler may be the consumer, the Internet service provider, or another entity which provides a profiling service.

The results of the correlations are received by the advertisers who then place bids to have their ads transmitted to the consumer. The server hosting the web page selects a bid, notifies the advertiser, and transmits the advertisement to the consumer as part of the web site the consumer has accessed.

Although this invention has been illustrated by reference to specific embodiments, it will be apparent to those skilled in the art that various changes and modifications may be made which clearly fall within the scope of the invention. The invention is intended to be protected broadly within the spirit and scope of the appended claims.

Claims

What is claimed is:

1. In a networked environment having a plurality of computer systems interconnected for the purpose of instantaneously transmitting and receiving data, a method for auctioning an advertisement opportunity, said method comprising the steps of:

(a) providing notification of an advertisement opportunity from a content/opportunity provider computer system, wherein said advertisement opportunity corresponds to an opportunity to transmit an advertisement to a consumer;

(b) receiving an advertisement characterization from an advertiser computer system, wherein said advertisement characterization corresponds to an advertisement;

(c) calculating a correlation factor between said advertisement characterization and said consumer in a profiler computer system;

(d) transmitting said correlation factor to said advertiser computer system;

(e) receiving a successful bid for said advertisement opportunity at said content/opportunity provider computer system, wherein said successful bid results in the transmission of said advertisement to said consumer in said advertisement opportunity.

2. The method described in claim 1 wherein said advertisement characterization is in the form of an ad characterization vector, said consumer is represented by a consumer characterization vector, and said correlation factor in step (c) is calculated as the scalar product

between said ad characterization vector and said consumer characterization vector.

3. The method described in claim 2 wherein said consumer characterization vector contains a demographic characterization of said consumer and wherein said ad characterization vector contains a demographic characterization of the target market for said advertisement.

4. The method described in claim 2 wherein said consumer characterization vector contains a product preference characterization of said consumer and wherein said ad characterization vector contains a product preference target market for said advertisement.

5. In a networked environment having a plurality of computer systems interconnected for the purpose of instantaneously transmitting and receiving data, a method for auctioning an advertisement opportunity, said method comprising the steps of:

(a) providing notification of an advertisement opportunity from a content/opportunity provider computer system to a plurality of computer systems representing advertisers, wherein said advertisement opportunity corresponds to an opportunity to transmit an advertisement to a consumer;

(b) receiving a plurality of advertisement characterizations from said plurality of computer systems representing advertisers, wherein each of said advertisement characterizations corresponds to an advertisement;

(c) calculating a plurality of correlation factors between said advertisement characterizations and said consumer in a profiler computer system;

(d) transmitting said correlation factors to said plurality of computer systems representing advertisers;

(e) receiving a plurality of bids for said advertisement opportunity at said content/opportunity provider computer system;

(f) selecting a successful bid from said plurality of bids for said advertisement opportunity wherein said successful bid results in the transmission of said advertisement to said consumer in said advertisement opportunity.

6. The method described in claim 5 wherein said advertisement characterization is in the form of an ad characterization vector, said consumer is represented by a consumer characterization vector, and said correlation factor in step (c) is calculated as the scalar product between said ad characterization vector and said consumer characterization vector.

7. The method described in claim 6 wherein said consumer characterization vector contains a demographic characterization of said consumer and wherein said computer readable ad characterization vector contains a demographic characterization of the target market for said advertisement.

8. The method described in claim 6 wherein said consumer characterization vector contains a product preference

characterization of said consumer and wherein said computer-readable ad characterization vector contains a product preference target market for said advertisement.

9. The method described in claim 5 wherein the selecting of said successful bid in step (f) is based on the highest bid of said plurality of bids.

10. A data processing system for auctioning an advertisement opportunity, said data processing system comprising:

(a) computer processing means for processing data;

(b) first means for transmitting an advertisement opportunity announcement wherein said advertisement opportunity announcement corresponds to an advertisement opportunity;

(c) second means for receiving an advertisement characterization wherein said advertisement characterization corresponds to an advertisement;

(d) third means for correlating said advertisement characterization with a consumer profile to produce a correlation result;

(e) fourth means for transmitting said correlation result;

(f) fifth means for receiving a bid for said advertisement opportunity.

11. The data processing system described in claim 10 further comprising:

(g) sixth means for determining if said bid is acceptable.

12. The data processing system described in claim 10 wherein said advertisement characterization is in the form of an ad characterization vector and wherein said consumer profile is in the form of a consumer characterization vector.

13. The data processing system described in claim 12 wherein said third means for correlating said advertisement characterization with a consumer profile to produce a correlation result calculates the said correlation result as a scalar product between said ad characterization vector and said consumer characterization vector.

14. A computer program embodied on a computer-readable medium for auctioning an advertisement opportunity, said computer program comprising:

(a) an advertisement source code segment for receiving an advertisement characterization;
(b) a consumer characterization code segment for receiving a unique consumer ID and retrieving a consumer characterization corresponding to said unique consumer ID;
(c) a correlating source code segment for calculating a correlation factor between said advertisement characterization and said consumer characterization;
(d) a transmitting source code segment for transmitting said correlation factor;
(e) a bid receiving source code segment for receiving a bid for said opportunity; and
(f) a selecting source code segment for selecting a successful bid which results in transmission of said advertisement to said consumer.

15. The computer program described in claim 14 wherein said advertisement characterization is in the form of an ad characterization vector and wherein said consumer profile is in the form of a consumer characterization vector.

16. The computer program described in claim 15 wherein said correlating source code segment calculates said correlation factor as the scalar product of said ad characterization vector and said consumer characterization vector.

17. A method of characterizing subscribers for subsequent targeting of advertisements, the method comprising the steps of:

(a) recording a series of subscriber viewing selections;

(b) creating a subscriber characterization based on the viewing selections and a set of heuristic rules;

(c) storing the subscriber characterization;

(d) allowing access to the subscriber characterization to determine the applicability of an advertisement in conjunction with the sale of an advertisement opportunity.

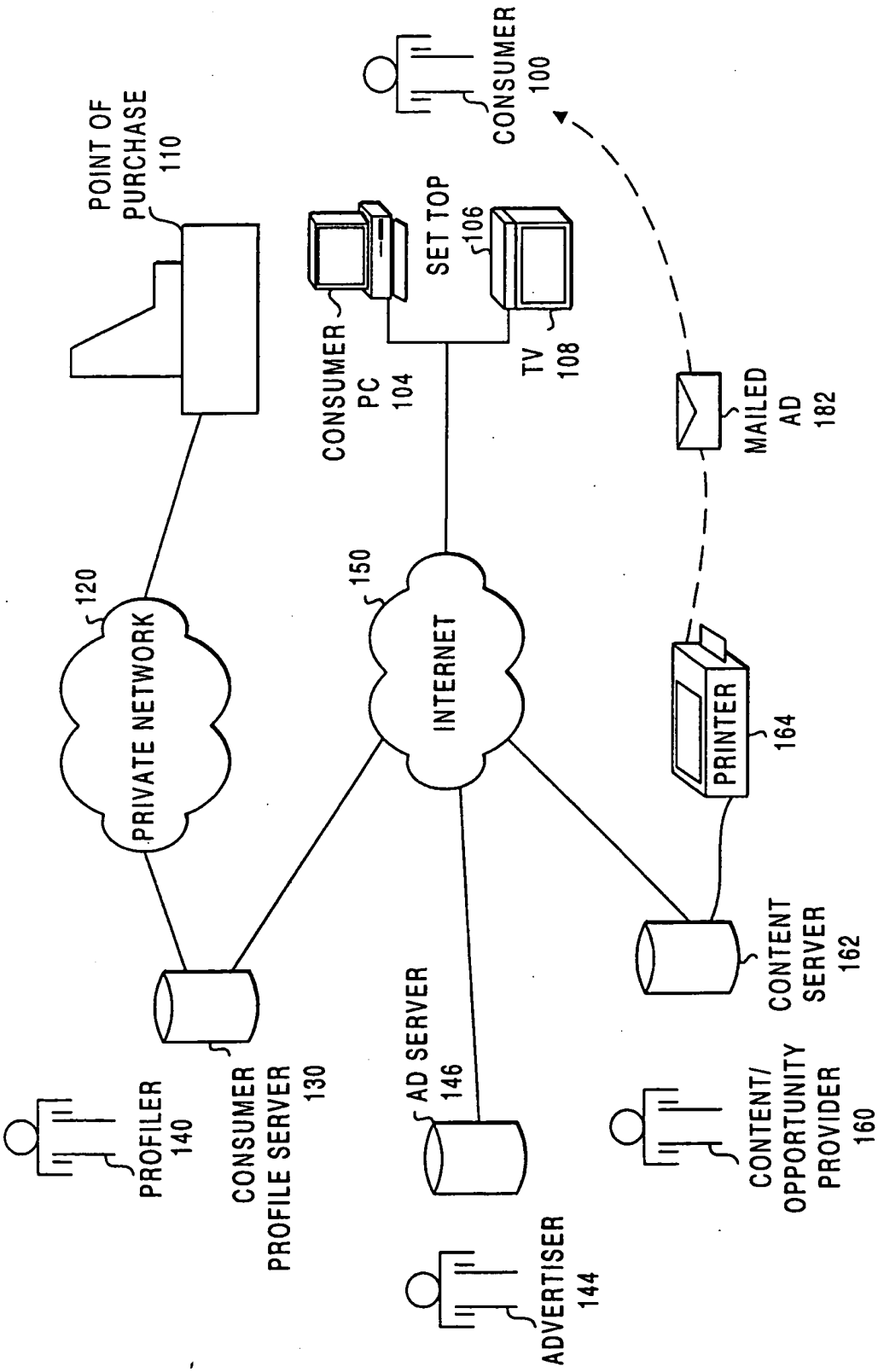

CONSUMER
100
POINT OF
PURCHASE
110
SET TOP
106
CONSUMER
PC
104
TV
108
MAILED
AD
182
120
PRIVATE NETWORK
150
INTERNET
PRINTER
164
PROFILER
140
CONSUMER
PROFILE SERVER
130
AD SERVER
146
CONTENT
SERVER
162
CONTENT/
OPPORTUNITY
PROVIDER
160
ADVERTISER
144

FIG. 1A

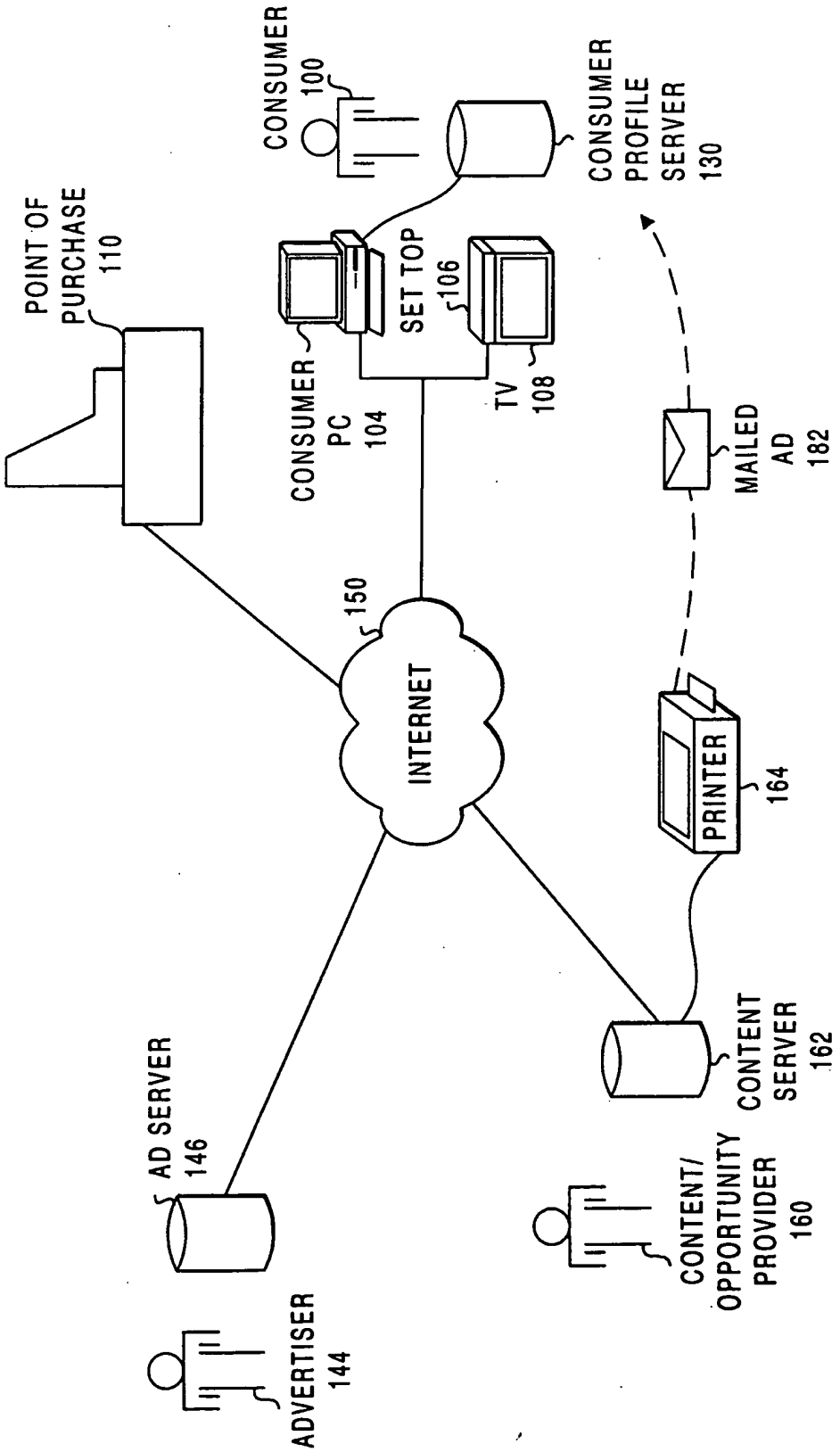

CONSUMER
100
CONSUMER
PROFILE
SERVER
130
POINT OF
PURCHASE
110
SET TOP
106
CONSUMER
PC
104
TV
108
MAILED
AD
182
150
INTERNET
PRINTER
164
AD SERVER
146
CONTENT
SERVER
162
CONTENT/
OPPORTUNITY
PROVIDER
160
ADVERTISER
144

FIG. 1B

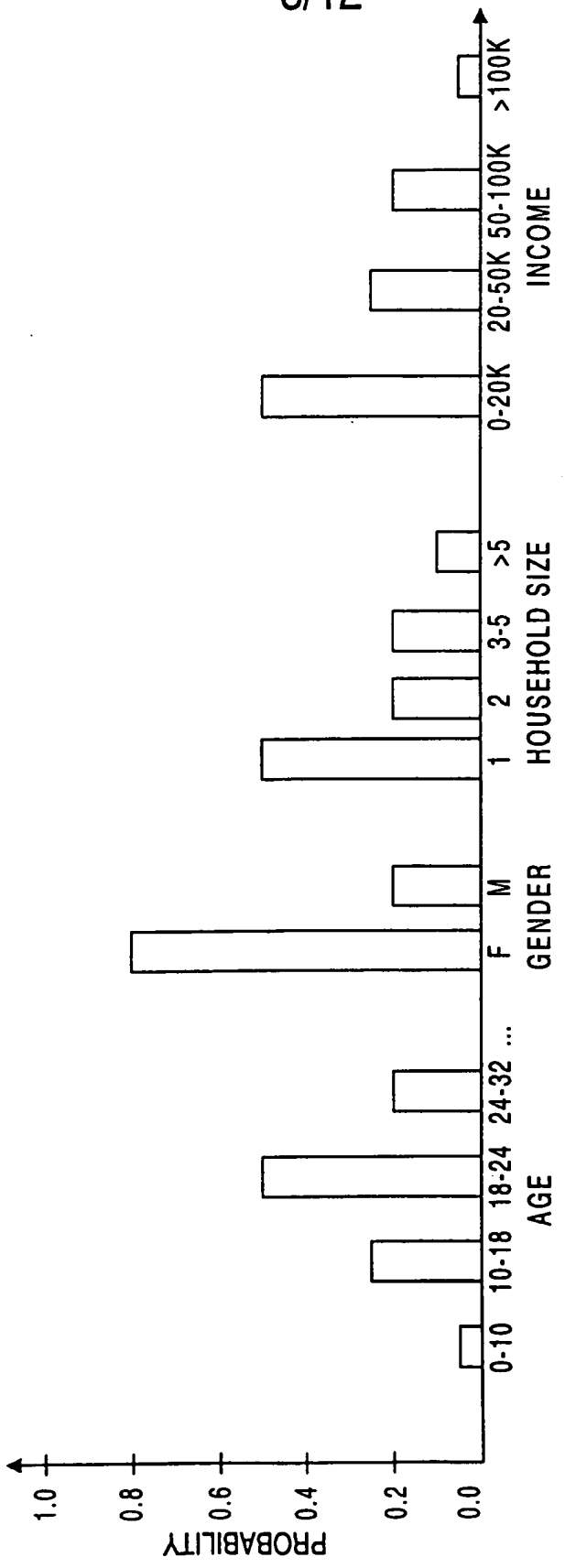

PROBABILITY
1.0
0.8
0.6
0.4
0.2
0.0
0-10
10-18
18-24
24-32
...
AGE
F
M
GENDER
1
2
3-5
>5
HOUSEHOLD SIZE
0-20K
20-50K
50-100K
>100K
INCOME

FIG. 2A

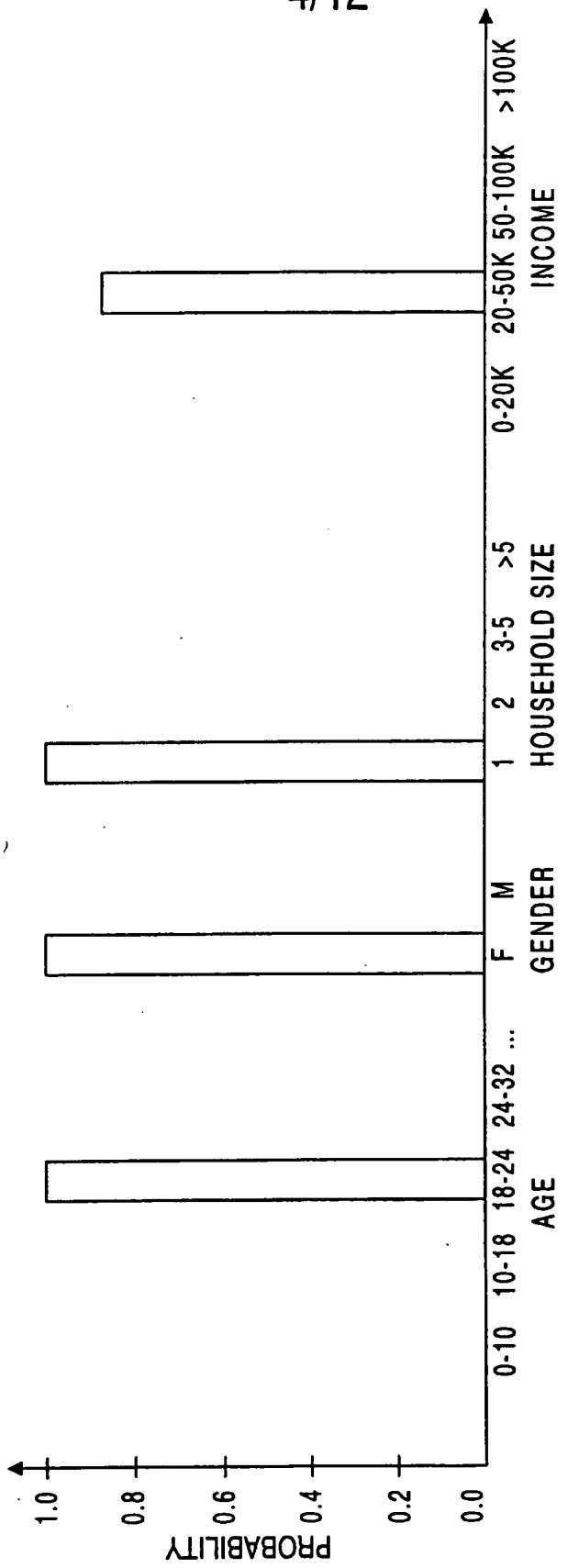

PROBABILITY
1.0
0.8
0.6
0.4
0.2
0.0
0-10
10-18
18-24
24-32
...
AGE
F
M
GENDER
1
2
3-5
>5
HOUSEHOLD SIZE
0-20K
20-50K
50-100K
>100K
INCOME

FIG. 2B

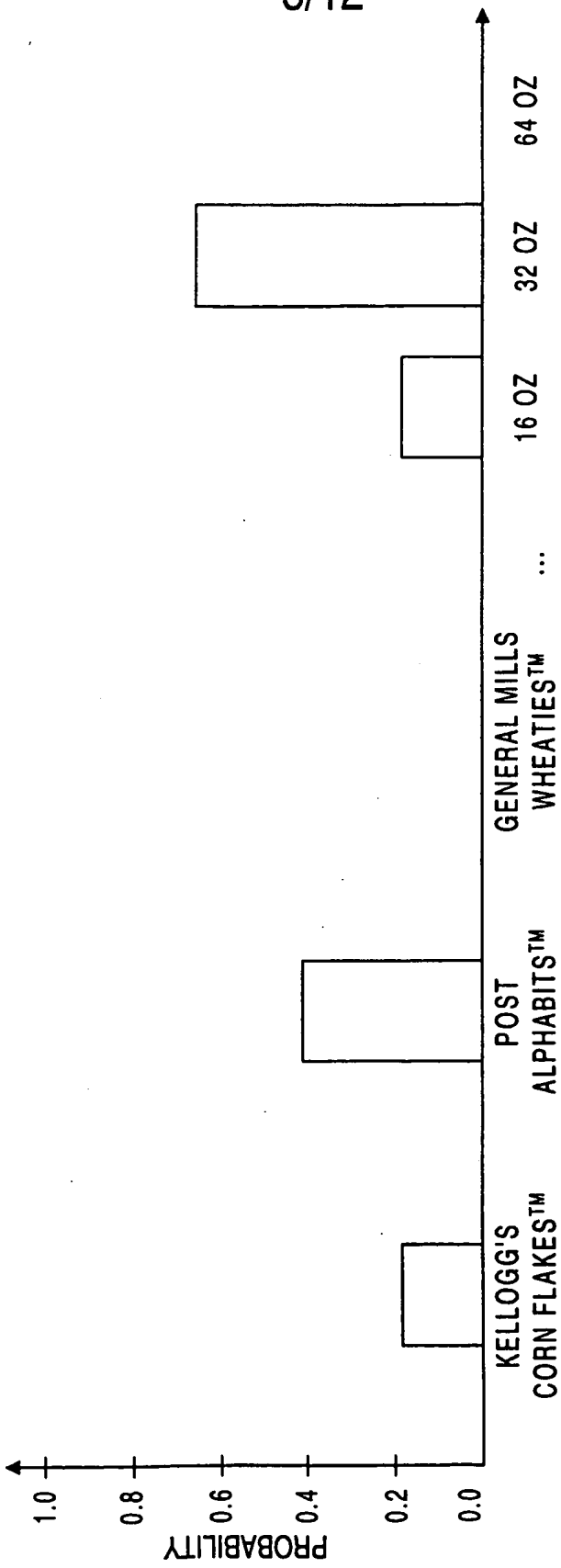

PROBABILITY
0.0
0.2
0.4
0.6
0.8
1.0
KELLOGG'S CORN FLAKES™
POST ALPHABITS™
GENERAL MILLS WHEATIES™
...
16 OZ
32 OZ
64 OZ

FIG. 2C

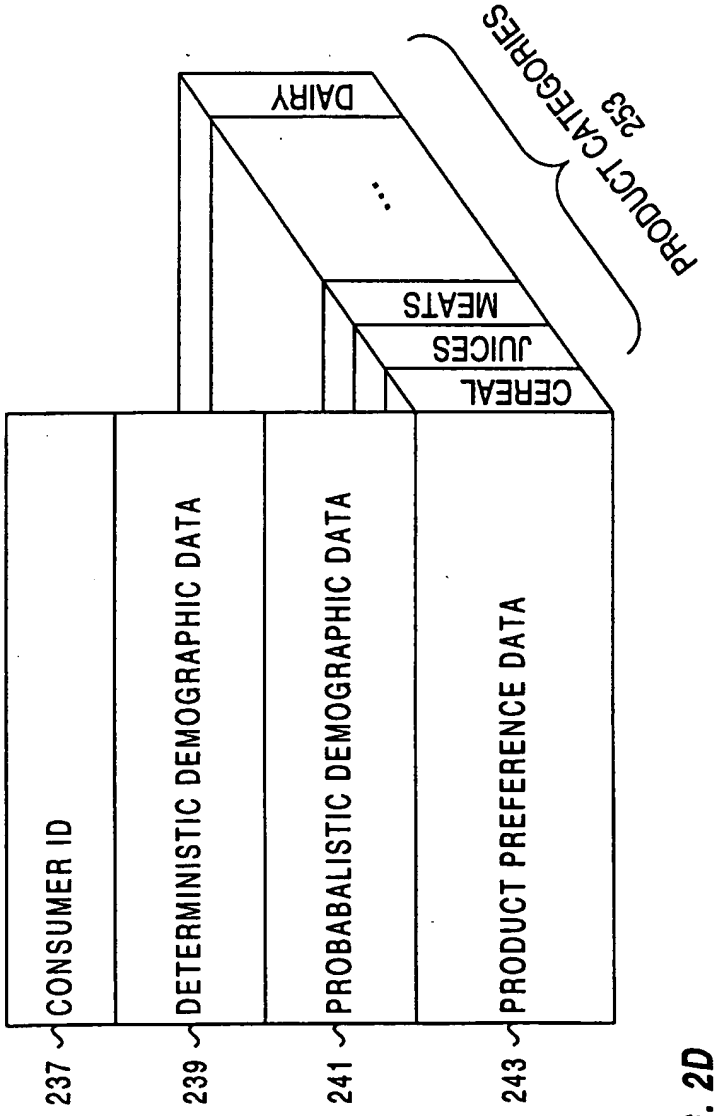

CONSUMER ID
DETERMINISTIC DEMOGRAPHIC DATA
PROBABALISTIC DEMOGRAPHIC DATA
PRODUCT PREFERENCE DATA
237
239
241
243
CEREAL
JUICES
MEATS
...
DAIRY
PRODUCT CATEGORIES
253

FIG. 2D

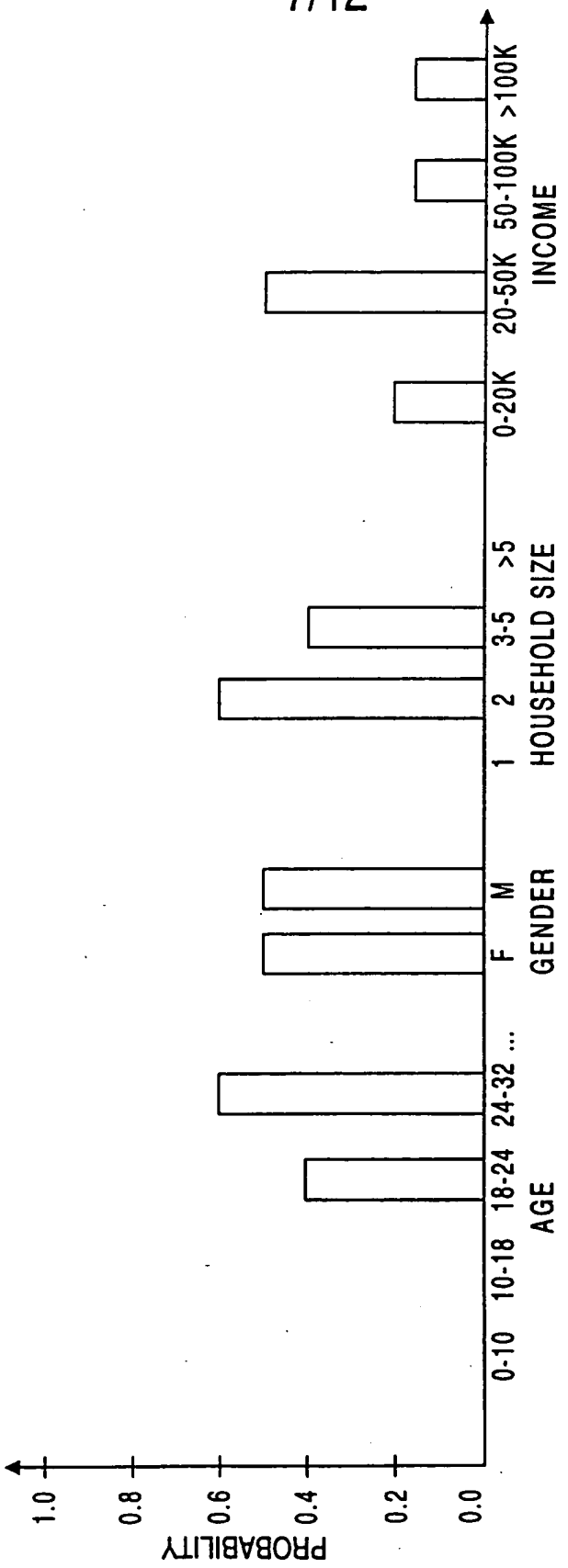

PROBABILITY
1.0
0.8
0.6
0.4
0.2
0.0
AGE
0-10
10-18
18-24
24-32
...
GENDER
F
M
HOUSEHOLD SIZE
1
2
3-5
>5
INCOME
0-20K
20-50K
50-100K
>100K

FIG. 3A

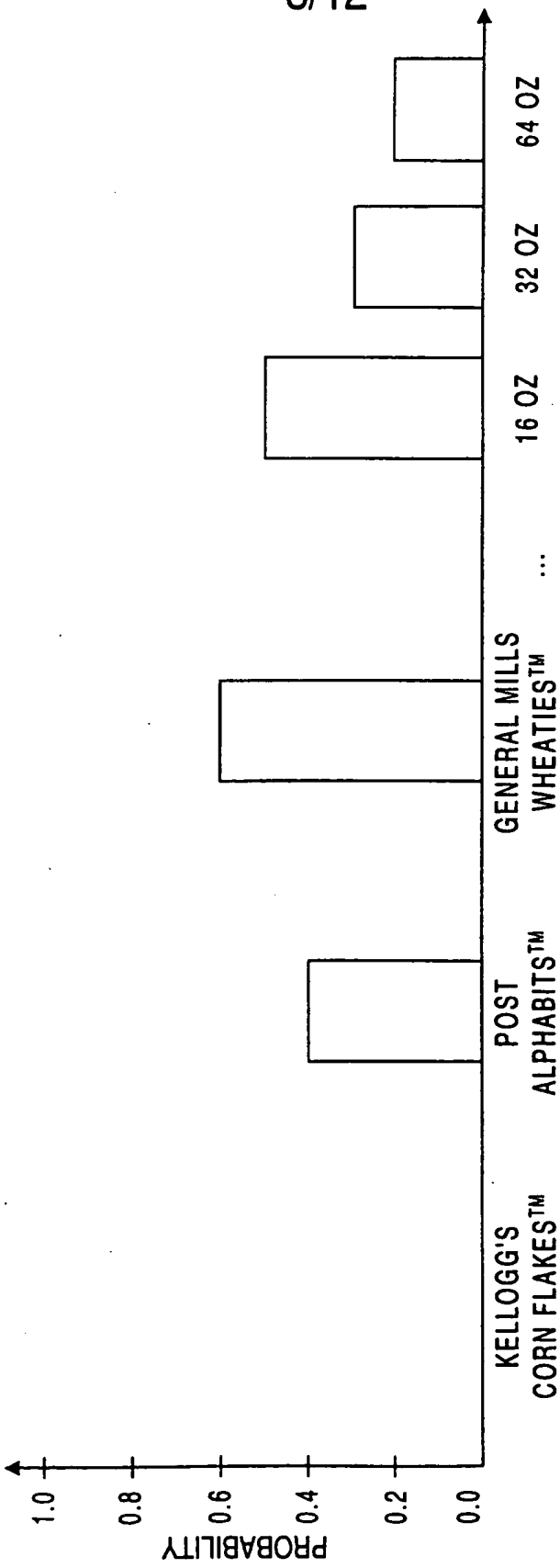

PROBABILITY
1.0
0.8
0.6
0.4
0.2
0.0
KELLOGG'S CORN FLAKES™
POST ALPHABITS™
GENERAL MILLS WHEATIES™
...
16 OZ
32 OZ
64 OZ

FIG. 3B

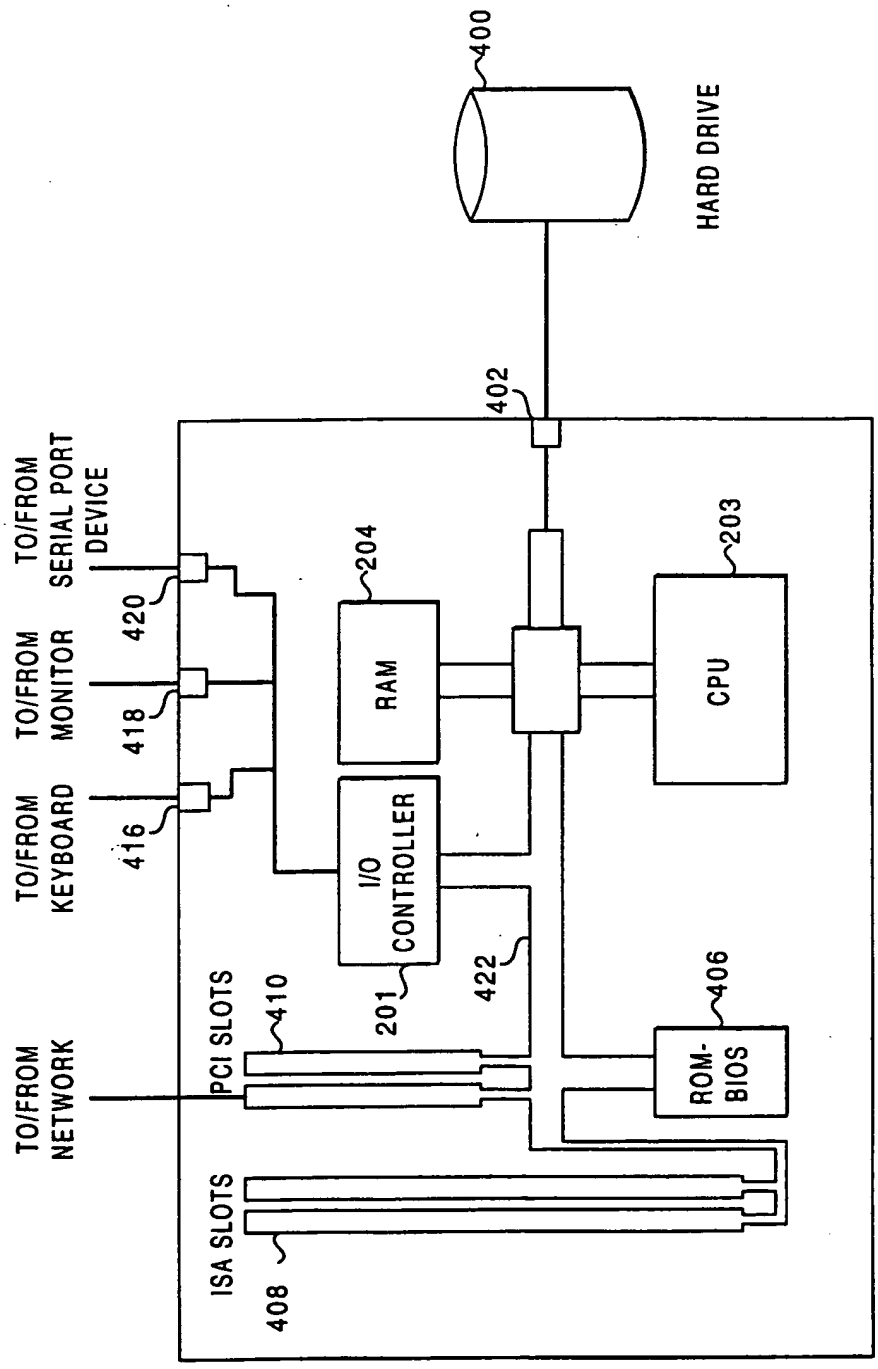

400
HARD DRIVE
402
TO/FROM SERIAL PORT DEVICE
420
TO/FROM MONITOR
418
TO/FROM KEYBOARD
416
TO/FROM NETWORK
204
RAM
203
CPU
I/O CONTROLLER
201
422
PCI SLOTS
410
406
ROM-BIOS
ISA SLOTS
408

FIG. 4

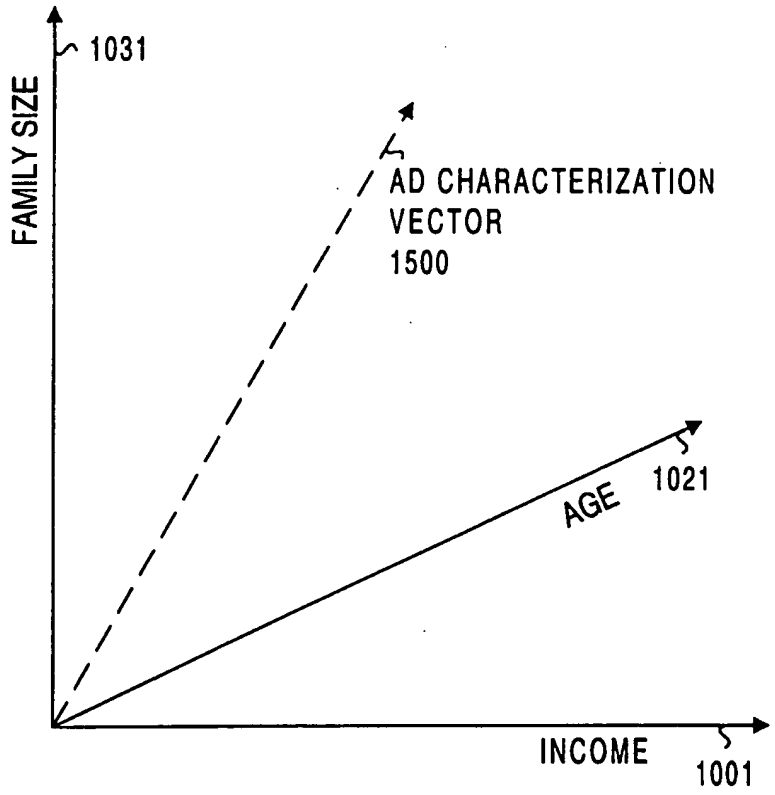

1031
FAMILY SIZE
AD CHARACTERIZATION
VECTOR
1500
AGE
1021
INCOME
1001

FIG. 5

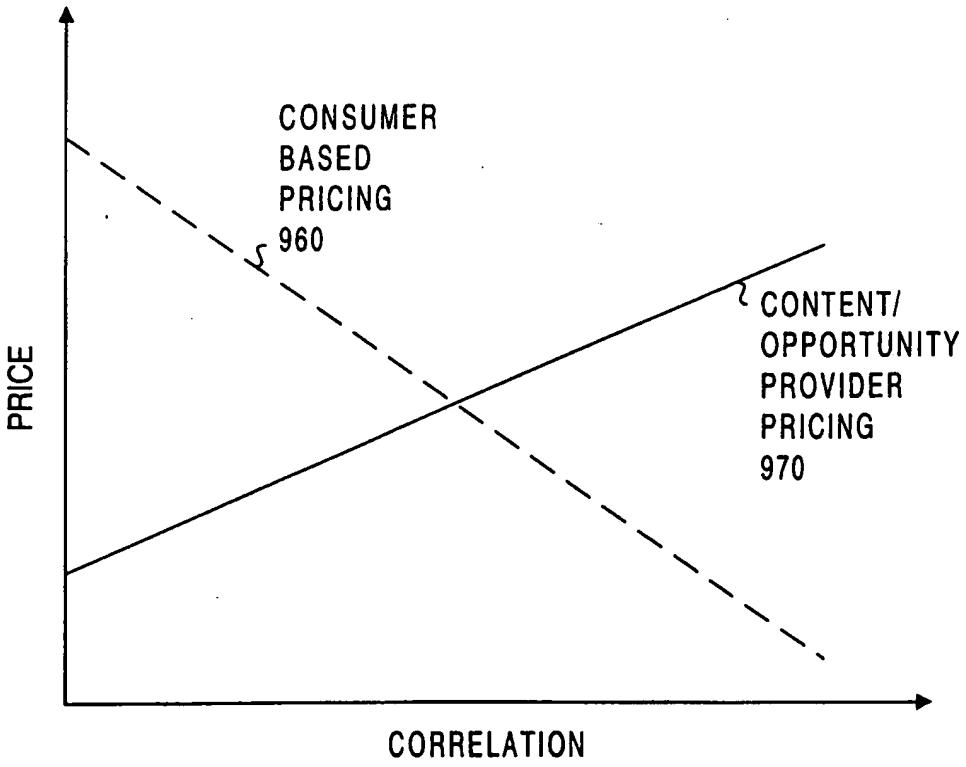

CONSUMER
BASED
PRICING
960
CONTENT/
OPPORTUNITY
PROVIDER
PRICING
970
PRICE
CORRELATION

FIG. 6

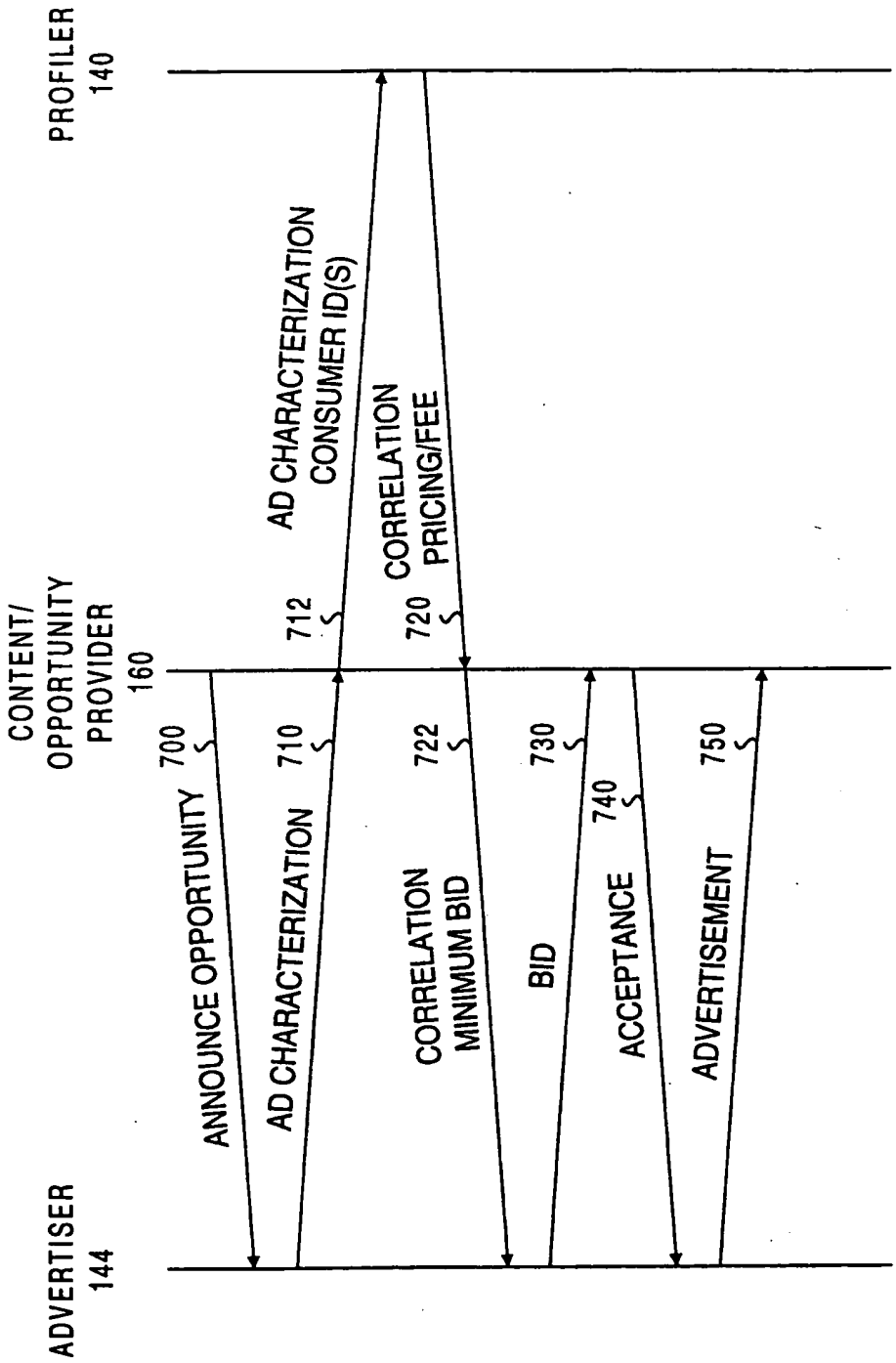

PROFILER
140
CONTENT/
OPPORTUNITY
PROVIDER
160
ADVERTISER
144
AD CHARACTERIZATION
CONSUMER ID(S)
712
CORRELATION
PRICING/FEE
720
700
ANNOUNCE OPPORTUNITY
710
AD CHARACTERIZATION
722
CORRELATION
MINIMUM BID
730
BID
740
ACCEPTANCE
750
ADVERTISEMENT

FIG. 7